

Greenworks Design Competition

Santa Fe. New Mexico. USA

PROGRAM REQUIREMENTS

The program requirements for the Greenworks design competition include the following:

- A site design for a residential compound of at least five (5) units, with a possible increase to six units, following all zoning, affordability and design requirements outlined in this section.it's, sustainability,
- A realistic line item cost breakdown that includes: 1) materials list and specifications; 2) the estimated cost of building per/square foot; 3) a statement of cost benefit realized through the use of sustainable design, materials, and building methods

A Statement of Sources and Uses that illustrates achievement of the affordability program required by the City of Santa Fe's Santa Fe Homes Program

(The project should result in at least two (2) homeownership units (2 bedroom), with sales prices ranging between \$126,000 to \$155,000, serving families or individuals earning from 65% of area median income (AMI) up to 80% of AMI, as defined by HUD.)

The statement should also identify possible sources of funding from state, federal and private sources, as well as available tax subsidy for green building. It should also account for incentives/fee waivers provided by the City of Santa Fe applicable to the affordably-priced units

- A narrative that serves as an outline for a future Green Development Plan. It should provide:
 - 1) A description of the process that was used to select the green building strategies, systems and materials that will be incorporated into the project;
 - 2) A listing of the team members who participated in the integrated design process, including name, affiliation/company, discipline; and
 - 3) A definition of the intent, objectives and/or goals of the proposed design and how they are expected to be achieved.

The narrative may further address how the proposed design can serve as a replicable development model and a pilot project for Santa Fe's Green Code. It may also describe the integration of green building with historic design and how the proposed design demonstrates responsiveness to the neighborhood context and incorporates community input. (Limit: 1,500 words).

Definition of intent

Goals-The intent is to design environment friendly housing based on the principles of sustainable design.

Objectives-The objective is to design:

A set of structures that meet the requirements of specific sections of society. Structures that are easily replicable
Structures that give the tenants a home and also give them a direct connect to the outside world.
Structures that maximize the tenants views to the best elements of the surrounding areas- the river in this case.

How this model is replicable

The very simplicity of the design is the foundation for replicability of this design. Simple rectangular organization of various functions allow this model to be built in any other location. This replication, however, will require certain site specific adjustments to the overall scheme. Again the simple design makes such adjustments easy.

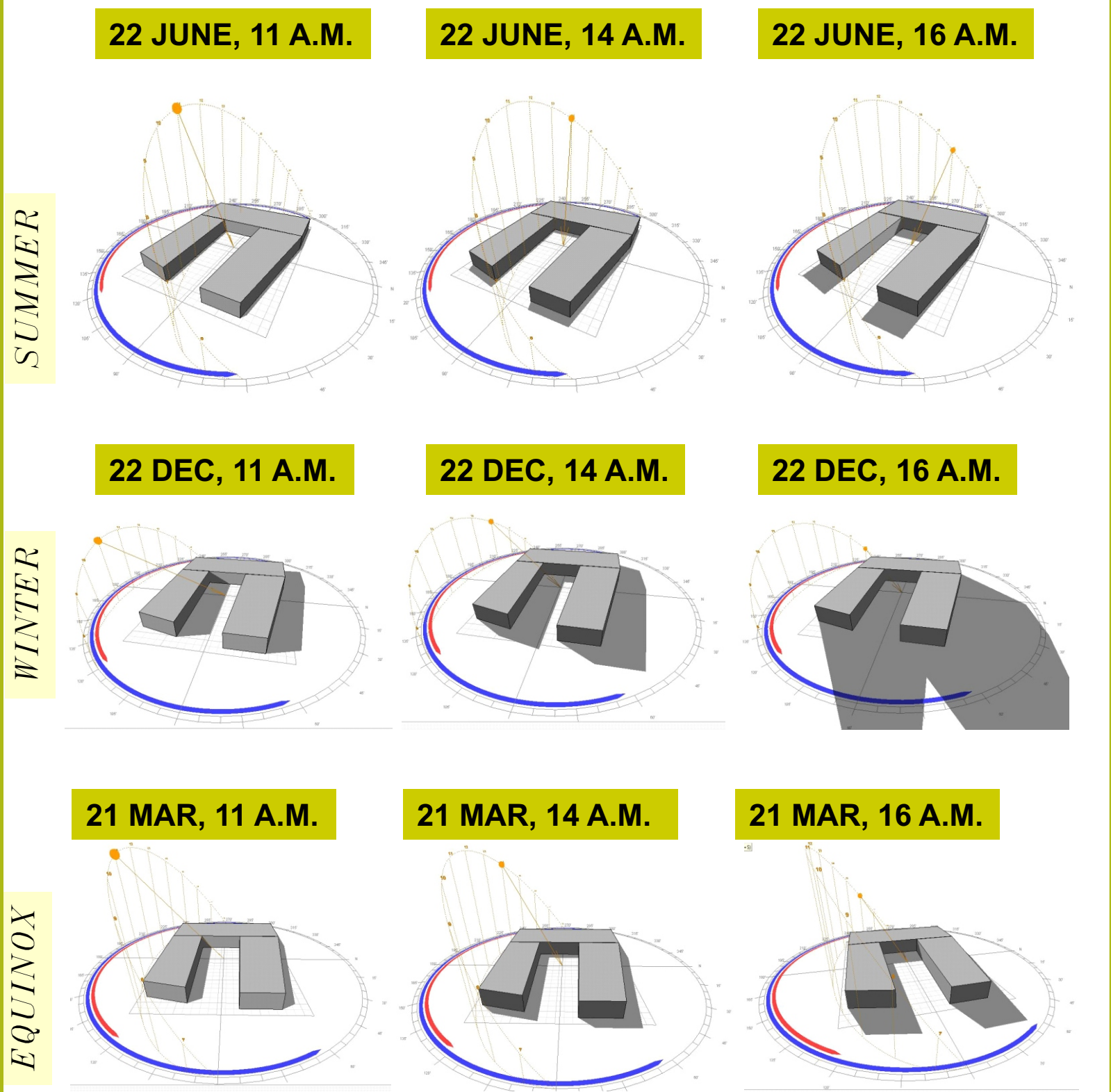
Introduction/infill of a Green building in Historic context.

Sustainable design is not a recent concept -its a recently lost one.
The reason we make buildings today is much the same as the reason we have always built-to make safe, healthy shelters that protect us from wind and rain, keep us warm when it's cold, and keep us cool and shaded when it's hot.

Over long periods of time, by trial and error, people have evolved the tried and proven solutions that we call vernacular building- and these solutions all contain elements of sustainable design.

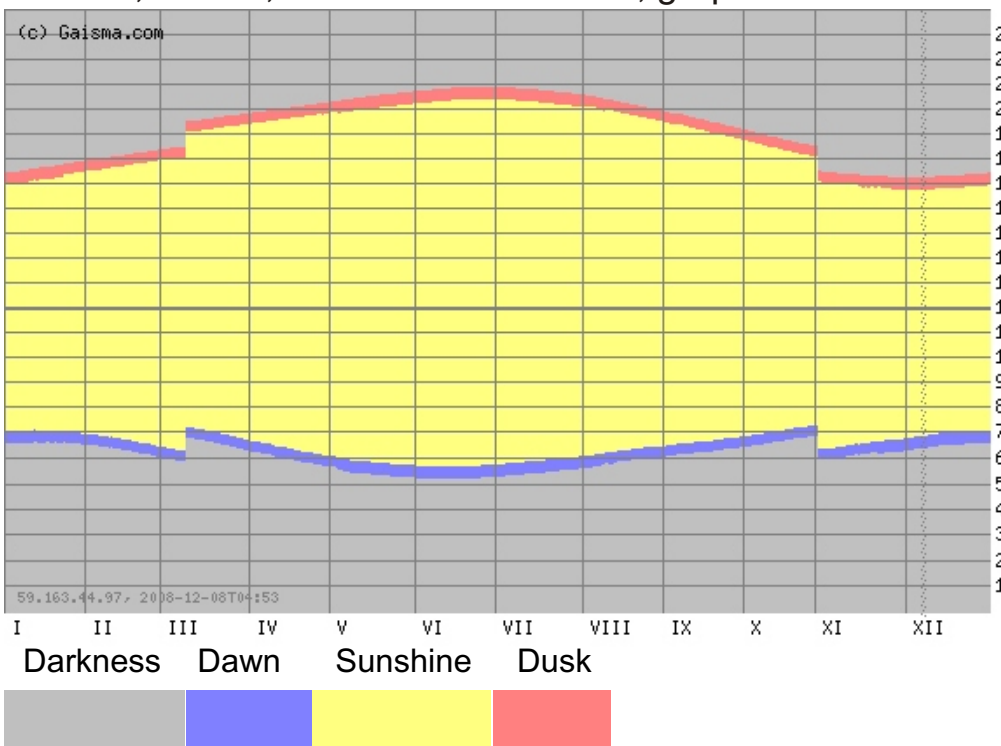
Again over a period of time, with newer technologies and their blind application across the globe without taking the regional context into account, the very same elements of sustainable design have been diluted. We have, in our design of this building provided a judicious mix of new technology along with the time tested principles of sustainable design.

Sunpath analysis



Climatic Data

Santa Fe, **New Mexico United States-**
Sunrise, sunset, dawn and dusk times, graph



Temperature

Month	Highs	Lows
January	40	19
February	44	22
March	51	28
April	60	35
May	69	43
June	79	52
July	91	57
August	91	56
September	74	49
October	63	38
November	50	27
December	41	20

Santa Fe, New Mexico, United States- Solar energy and surface meteorology

Variable	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Insolation, kWh/m ² /day	2.53	3.30	4.50	5.49	6.30	6.66	5.94	5.25	4.90	3.90	2.92	2.38
Clearness, 0 - 1	0.52	0.53	0.56	0.56	0.57	0.58	0.53	0.51	0.56	0.57	0.56	0.54
Temperature, °C	-3.02	-0.86	2.77	7.12	12.57	17.15	19.24	17.77	14.09	7.98	1.08	-3.16
Wind speed, m/s	4.69	4.66	4.77	4.79	4.62	4.38	3.87	3.72	4.44	4.50	4.83	4.63
Precipitation, mm	19	19	23	20	29	31	69	72	39	28	20	20
Wet days, d	4.3	4.6	5.5	4.2	5.4	5.8	10.2	10.8	7.3	4.9	4.3	4.7

Challenges

Green communities criteria 2008



SUSTAINABILITY

ZONING



ANNUAL MEDIAN INCOME

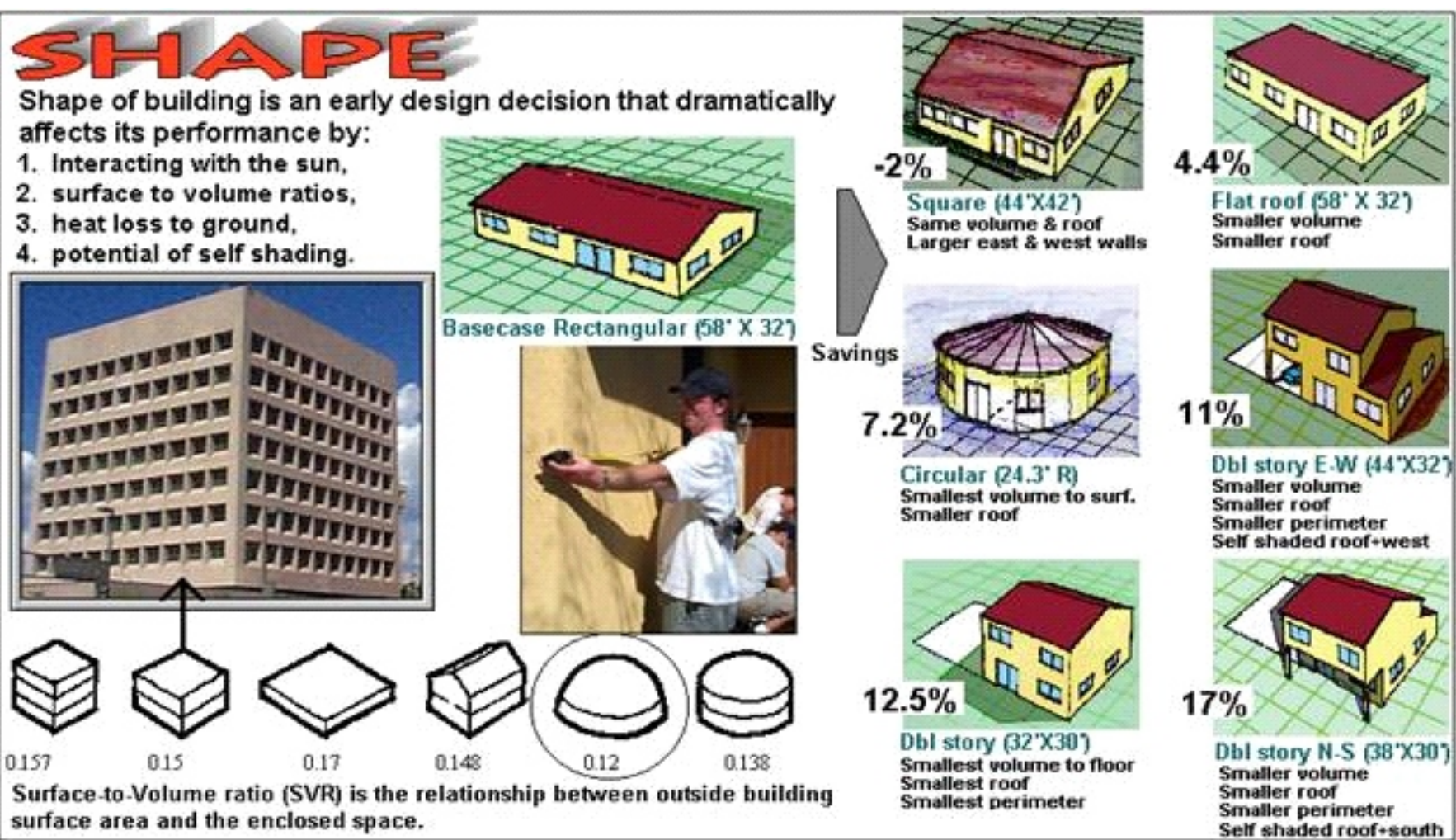
SANTA FE HOMES PROGRAM

AFFORDABILITY

HISTORIC DESIGN OVERLAY



Analysis



Smaller surface to volume ratio (smaller surface area), which is directly exposed to sun reduces heat gain by the structure, hence large wall surfaces are necessary in colder climates to increase heat gain.

Case study: Jaipur, India

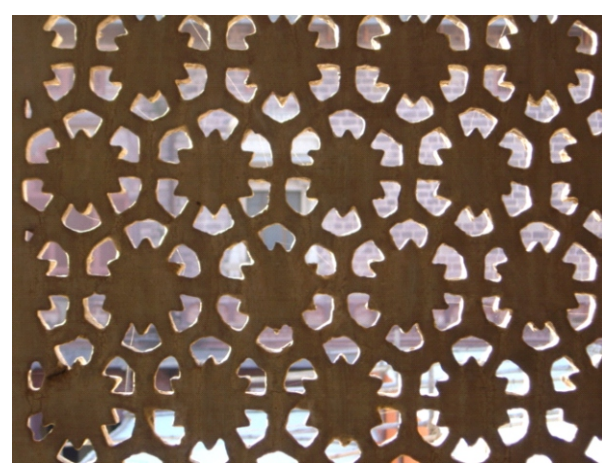
Courtyard planning:
Temperatures soars up to forty five degrees during the sweltering summer months and plummets down to twenty two degrees during the chilly winter season, hence courtyard planning is breather for the building.



Arcade Corridors:
Arcaded corridors facing internal court helps to prevent direct heat gain in rooms and also appreciates the landscaped courts.



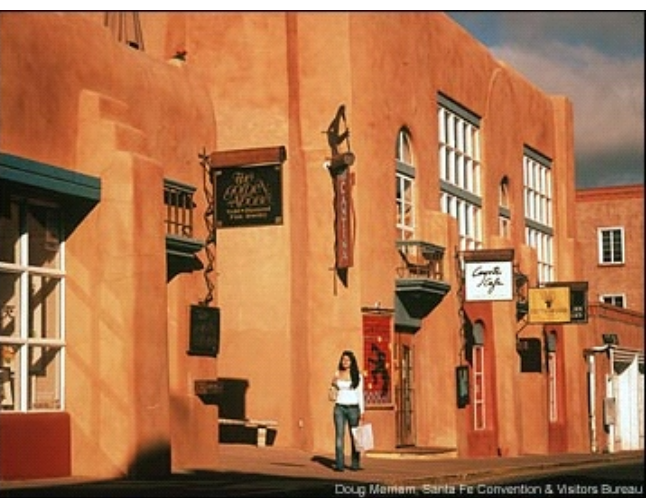
Jalis
Intricately carved jalis serves dual purpose of ventilators and decorative motifs.

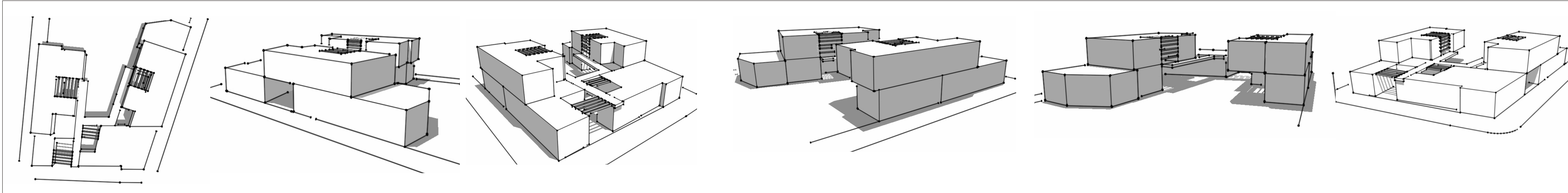


Coordinates: 35°40'2"N 105°57'52"W

Average rainfall: 14 inches
Average snowfall: 32 inches
Prevailing winds: 7 mph SW
Average date of first frost: Oct 10
Average date of last frost: May 1

Context





Design Process:

The design of the units and its layouts draws inspiration from the existing features and surrounding environment. The river which flows to the north, the existing buildings and the need to give the tenants the maximum from the habitat has been the driving force in the design of the building.

Emphasis on creating a courtyard to allow free movement of the elements, giving all the tenants a good view of the river to the north and connect with nature are evident in all aspects of the design.

A play of levels, the green lawn over a manmade mound on the sou direct access to the carparksat the stilt level, give a impressive mix of utility, greenery and functionality to the living space.

Materials of construction:
Walls are constructed out of 2 layers 4hollow blocks with a 2 air gap between them. The total thickness of the wall would be 10" Stucco or Adobe plaster on the exterior provides continuity of the surrounding architecture. It is also a good insulator.

A cavity roof is proposed to trap heat and provide a comfortable indoor environment in winter.

Timber flooring is provided to take advantage of it poor conducting properties

A strong feature of the design is Xeriscaping. Due to this there is very little or no requirement of water from an external source to maintain the landscape and its features

A few important aspects of sustainable design that have been taken care of are:
Reuse of earth excavated during construction to create the landfill on the south side. This landfill also acts as a insulating feature taking advantage of the High insulation properties of the earth.

Views of the River from all the houses
Use of Sun path diagrams and resultant shadings to improve design.
Use of skylights and windows to maximize natural lighting.
Green courtyards to improve permeability of the open spaces.

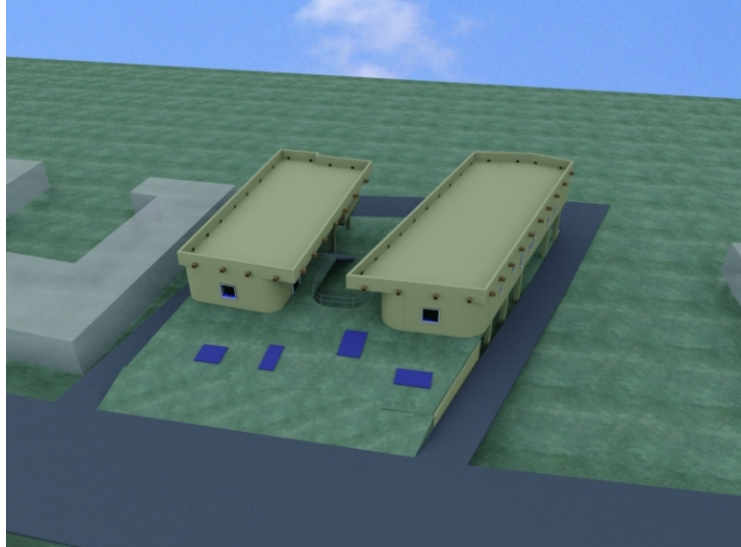
Views



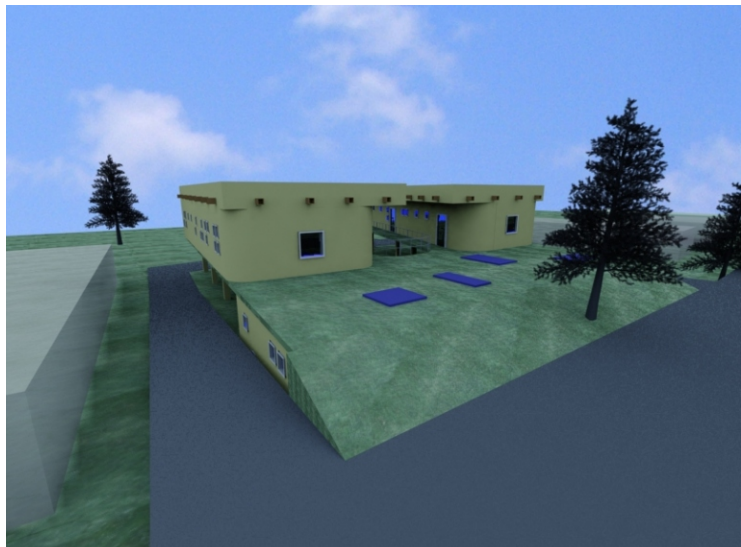
North-west side view



South-east side view



Birds eye view

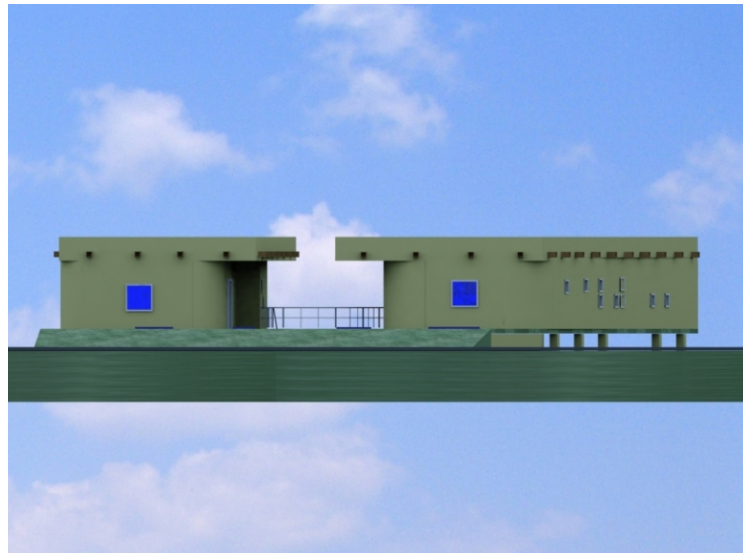


South-west side view

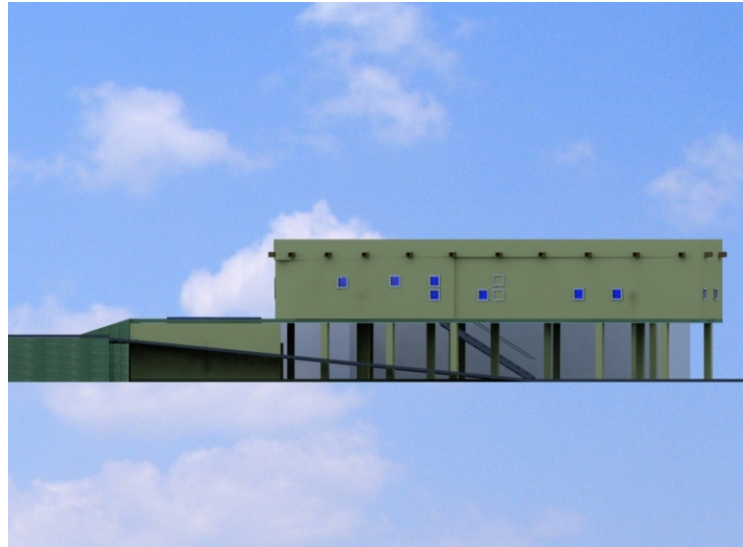


North-east side view

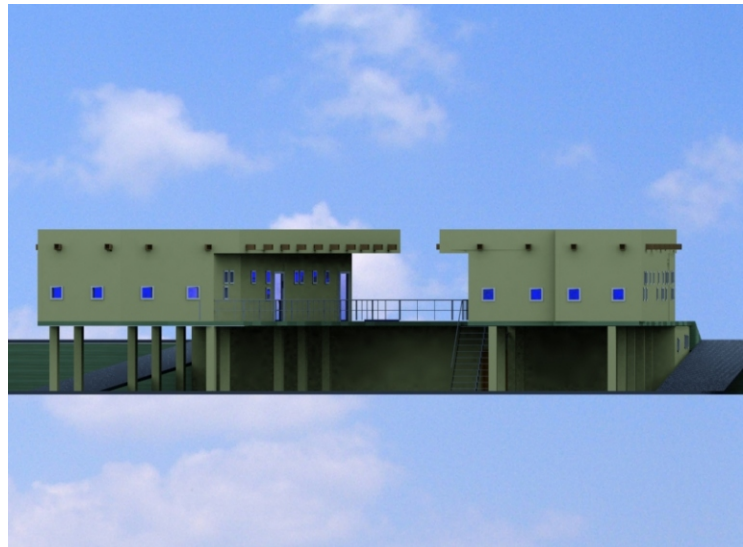
Elevation



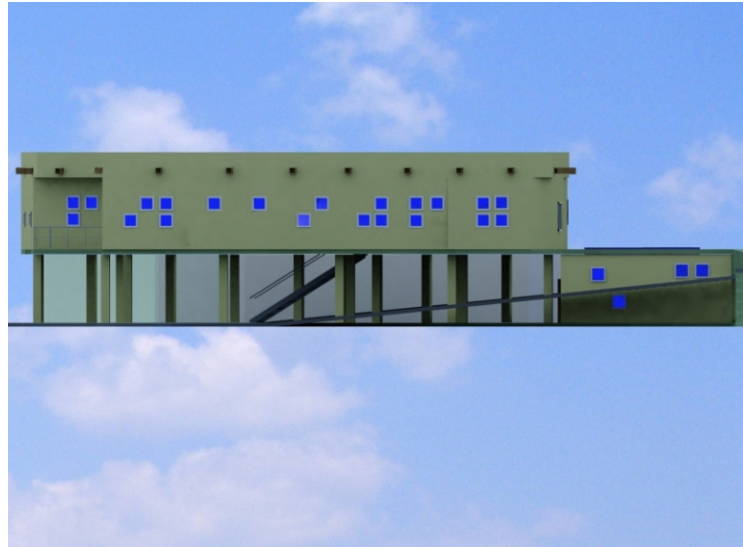
North side elevation



East side elevation



South side elevation



West side elevation

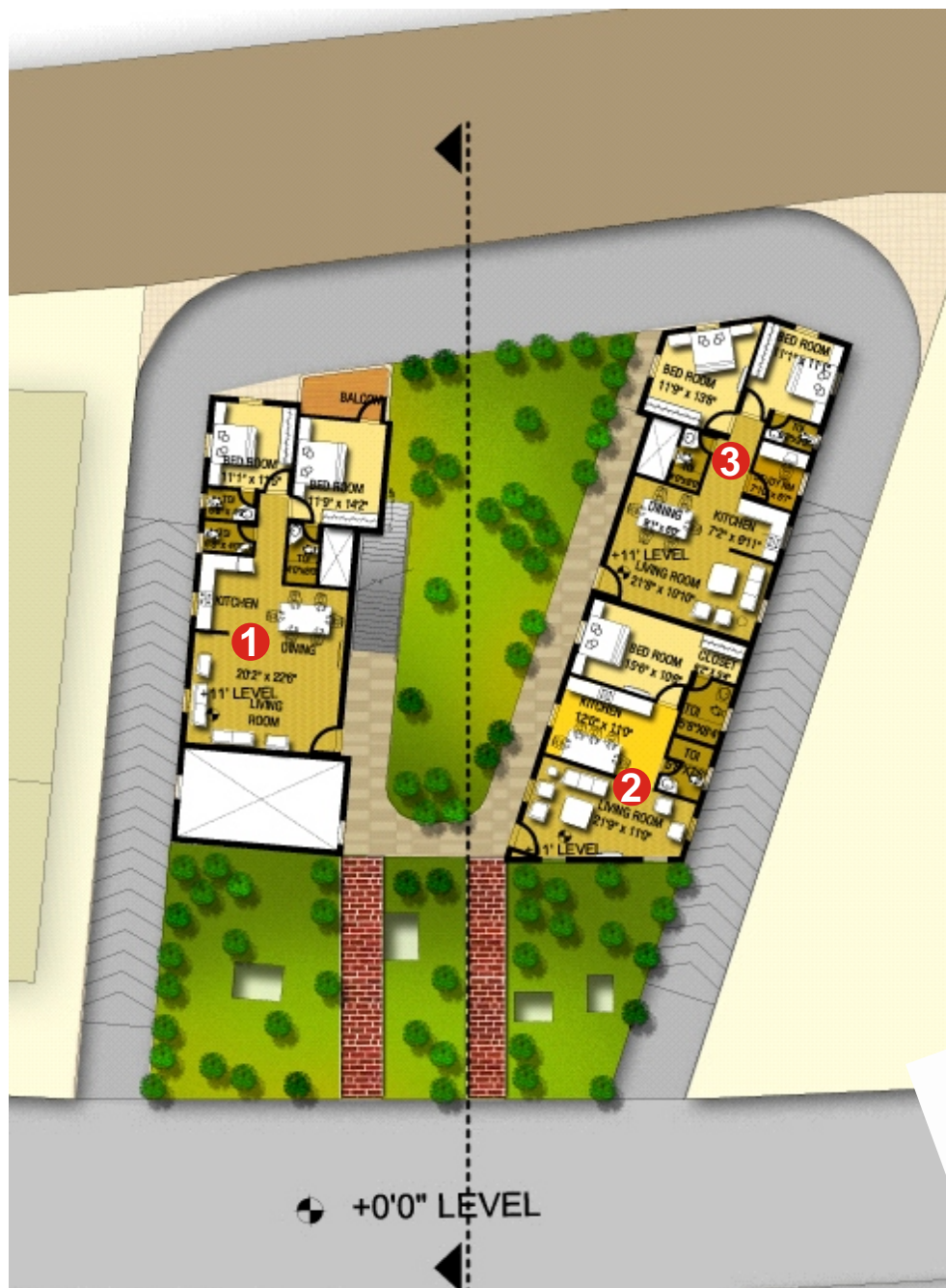


South-east side view



Smart site location

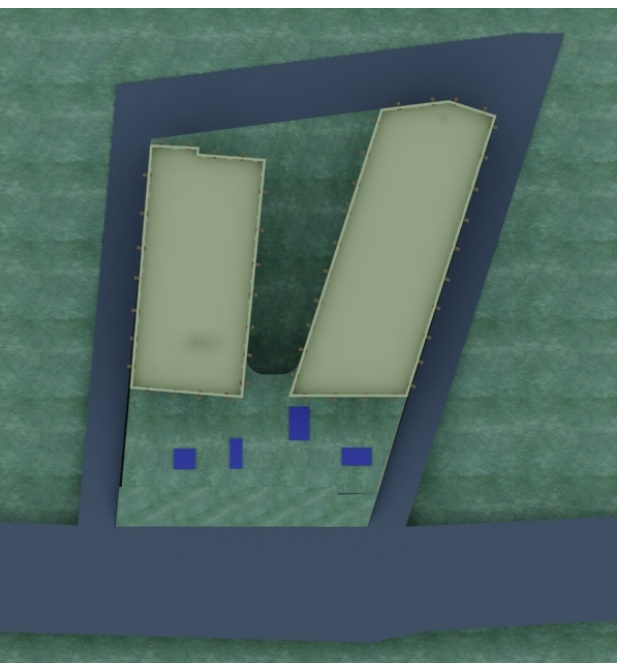
Site comes under the category of smart site location due to it's connectivity & proximity to transit junction



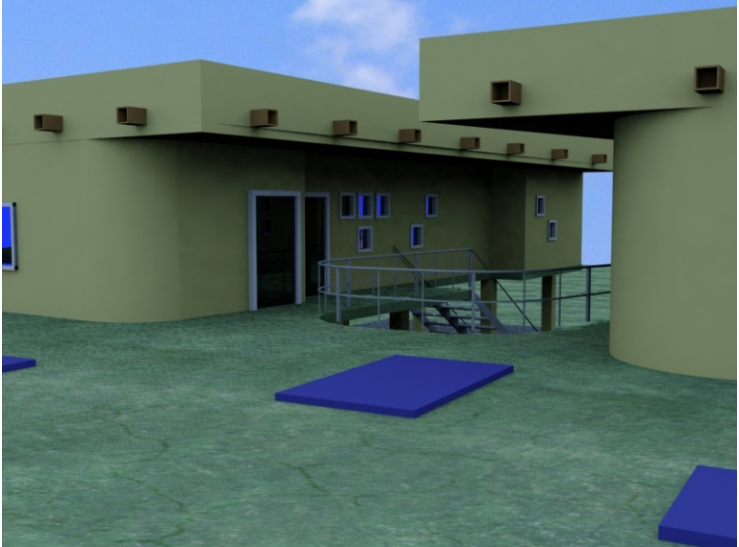
Plan at + 4ft. Level



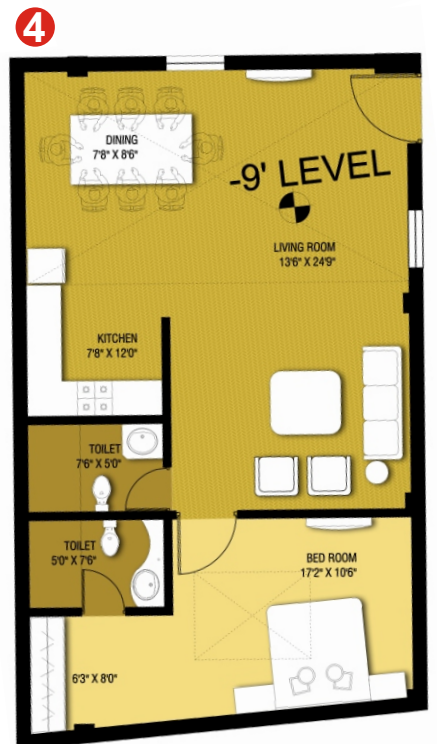
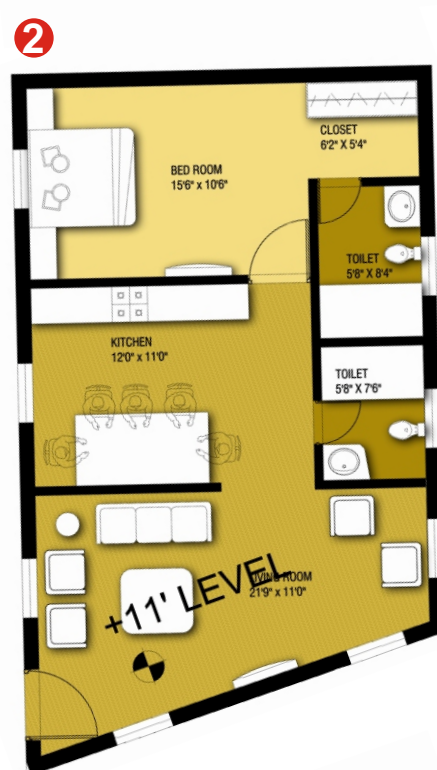
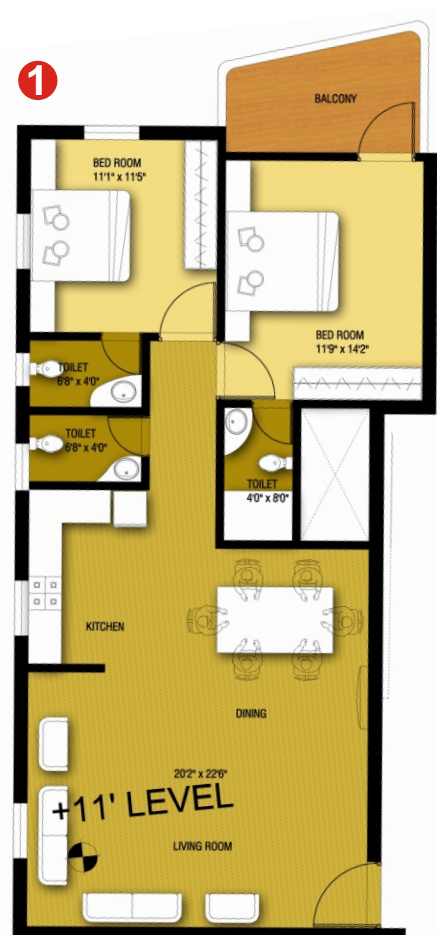
Plan at - 6ft. Level



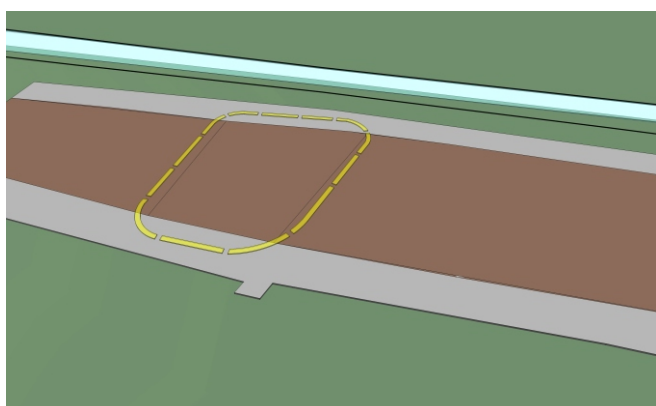
Roof plan



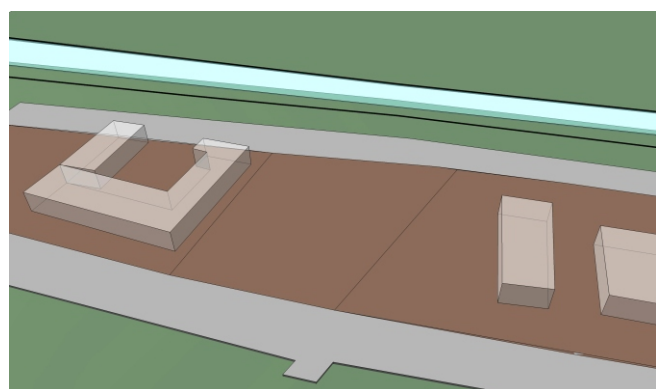
View from the entrance mound



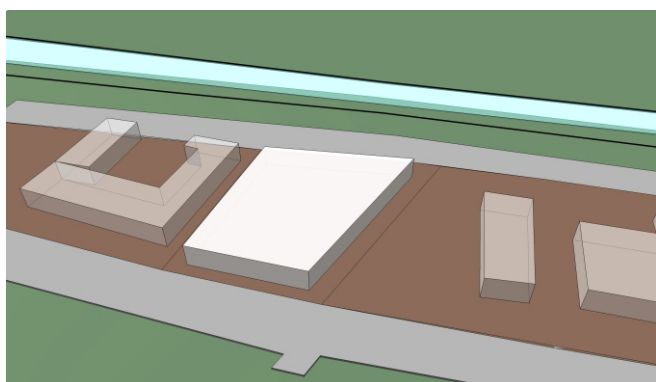
Design development



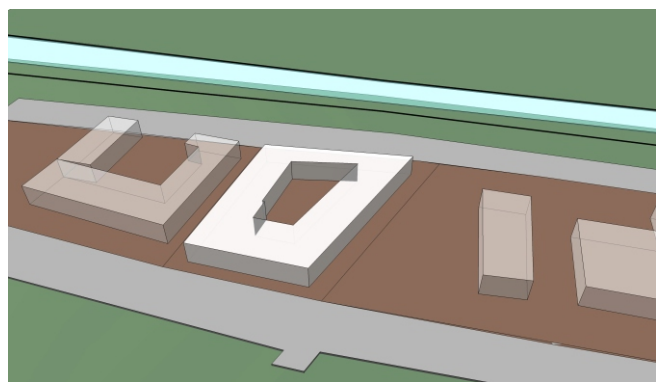
Site



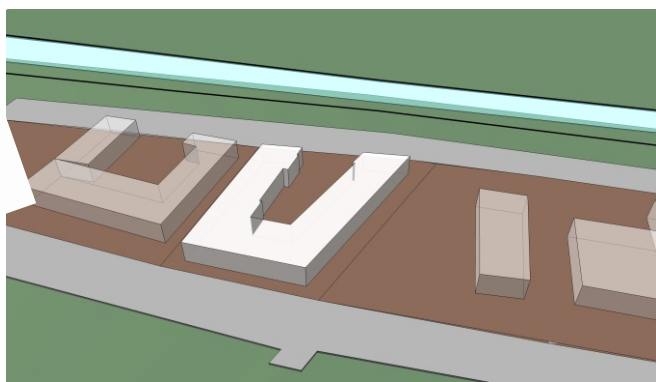
Immediate context



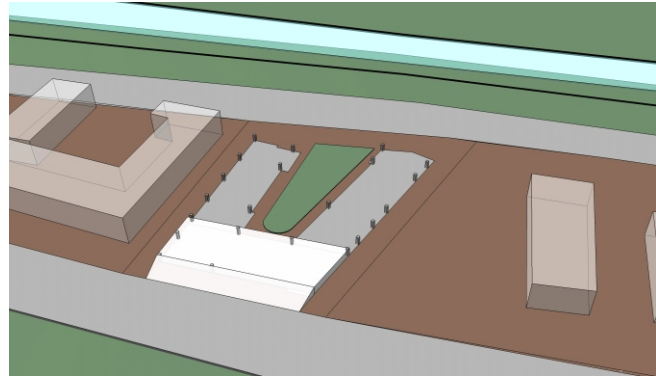
Built mass



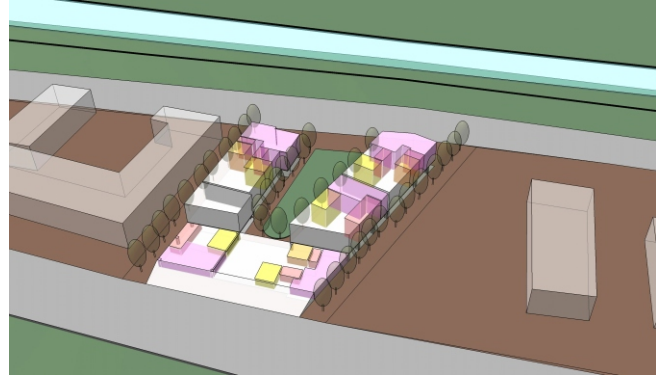
Community space



River view



Mound & stilts



Functions

Unit 1- 1000 sqft. 2 bedroom
Unit 2- 850 sqft. 1 bedroom
Unit 3- 1000 sqft. 2 bedroom
Unit 4- 850 sqft. 1 bedroom
Unit 5- 1000 sqft. 2 bedroom

Total ground coverage 4,700 sqft.
Landscape area 3,500 sqft.
Peripheral road 1200 sqft.